March / April 1989

METRO Magazine

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METRO. Magazine

a bobit publication — serving surface mass transportation for 85 years

vol. 85 no. 2

BOBIT PUBLISHING

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American Public Transit Association — APTA — United Bus Owners of America — ABA American Bus Association — Highway Users Federation — ABP — BPA

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Bus Maintenance Costs Tracked in Survey

Roadcalls and miles per gallon are identified as the most common indicators of bus performance by maintenance managers.

Top 25 Indicators of Bus Maintenance

Indicator	Number of Entries
Miles per gallon	51
Miles per quart of oil	38
Miles per roadcall (unspecified)	36
Periodic roadcalls (e.g. per month)	30
Maintenance cost per mile	27
Repeat work	20
Operator reported defects	18
Inspection (PM) backlog	15
Total labor man-hour per bus mile	15
Average bus availability	12
General bus appearance	12
Fluid consumption	11
Absenteeism	11
General quality of maintenance work	11
Miles between failures	10
Passenger complaints	9
Defects discovered during inspection	9
Number of inoperative buses	8
Overtime	8
Miles per roadcall — mechanical cause	8
Percentage of trips missed	8
Maintenance cost per bus	7
Parts cost per mile	7
Brake life	7
Oil analysis	7

Chart lists the top 25 maintenance items cited by respondents as the prime indicators of maintenance needs. The above items represent 60% of responses to the APTA Bus Maintenance Survey. The left column lists the indicators while the right column lists the frequency of responses.

Choosing the right performance indicators to control the quality of vehicle mainenance has been and continues to be a problem of concern to the transit industry. It is particularly important today due to cutbacks in federal support for the acquisition of new buses and state and local belt-tightening. Transit operators see increasing pressure to obtain greater use from their existing equipment — a goal that can only be achieved by paying closer attention to the maintenance function.

In order to provide a more accurate interpretation of maintenance, APTA sponsored a survey on bus maintenance performance indicators. The survey results, both by themselves and when compared to past surveys or related projects, provide a better focus on maintenance functions that can be used as yardsticks for improving vehicle efficiency.

George F. List, assistant professor of civil engineering at Rensselaer Polytechnic Institute in Troy, N.Y. conducted the survey in July 1985 under the direction of APTA's Bus Maintenance Management Subcommittee. The survey results, which were outlined in a paper written by List and Mark Lowen, a graduate student at the institute, clearly identified roadcalls as the predominant initial performance indicator among maintenance managers. More than half of the respondents listed roadcall inspection maintenance as their yardstick in determining vehicle efficiency.

"The survey lets maintenance managers know how the industry as a whole is judging their vehicle performance," said John Schiavone, APTA's director of technology. "The intent [of the survey] was to have the database for future reference. We in the industry talked informally about these types of indicators but never had the concrete facts. We had always assumed this data was true before — now we have the specific information."

In addition to half the managers

The most important gauge of a transit bus' performance is miles per gallon, according to transit managers responding to an APTA Bus Maintenance Survey.

listing roadcall inspections as a prime indicator, another one-fifth of the managers listed roadcall indicators as an important gauge in determining vehicle condition. Some of the indicators used by maintenance managers include miles per roadcall (for unspecified reasons), periodic roadcalls (such as roadcalls per month), miles per failure and miles per roadcall due to mechanical causes.

Drivetrain elements were listed as the second most common performance indicator. Many agencies track performance by compiling data on fluid consumption, miles per gallon, miles per quart of oil, oil analysis and failure trends of drivetrain components. Cost factors followed drivetrain elements as the third prime indicator of performance efficiency. Among the indicators related to overall cost were maintenance dollars per bus mile, maintenance operating dollars per bus mile and periodic labor costs.

Maintenance managers also use general performance indicators to determine fleet efficiency. The survey found that performance indicators included inspection program performance; "interface with operations;" labor performance; overall maintenance performance; vehicle quality; performance of specific components other than the drivetrain (brakes, tires, air conditioning and wheelchair lifts), and general indicators of vehicle component performance.

When these categories are broken down specifically, the top individual indicator of vehicle performance, whether related to roadcalls or drivetrain efficiency, is miles per gallon. In other words, the most important gauge of a transit bus' performance, according to the 100 transit managers who answered the survey, is miles per gallon. This indicator is followed by miles per quart of oil, and miles per roadcall (see chart).

Other observations

Some other survey results should be noted, including the following observations:

- While labor was not a number one concern, it did have deep- rooted importance.
- The separate costs of labor and parts were not major indicators, even though total costs received significant attention.
- Inspection-related indicators were listed frequently, but only at lower priority levels.
- The adequacy of investment in shop capacity was not given much attention.
- Heavy repairs and inventory management never received major attention.

The survey also took into account the environments of operating systems. With this in mind, the survey included questions asking the respondent to describe the environment in terms of average road speed, stopping frequency, average ambient temperature, grades, potholes, street litter, percent of buses air conditioned, and percent of buses more than 10 years old. Another question asked the maintenance managers to break down their bus fleet in terms of small (under 35 feet), full size (35- to 40-feet) and articulated transit buses.

The survey found little evidence that these characteristics affect maintenance indicators. "The break-down of indicators in the survey seems to be the same regardless of operating environment," List noted in the survey, and roadcalls account for about 50 percent of the top-priority indicators regardless of composition. Other breakdowns by fleet size and environmental characteristics fail to show any obvious trends, thus suggesting that environmental factors do not play a major role in determining what indicators are important.

Conclusions

The survey succeeded in providing a better focus on what vehicle indicators are being used today by maintenance managers in determining their fleets' efficiency. "There are advantages to standardizing [performance indicators,]" Schiavone said, "but all transit systems are different, you can't compare. them one-to-one. This survey will act as a barometer or gauge to transit managers."

The concentration on roadcalls, followed by a search for a more specific indicator, shows that managers are on the same track when it comes to methods of isolating performance factors. However, the survey points out that differences in managerial philosophies prevent the formation of a single list of indicators. M

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May/June 1989

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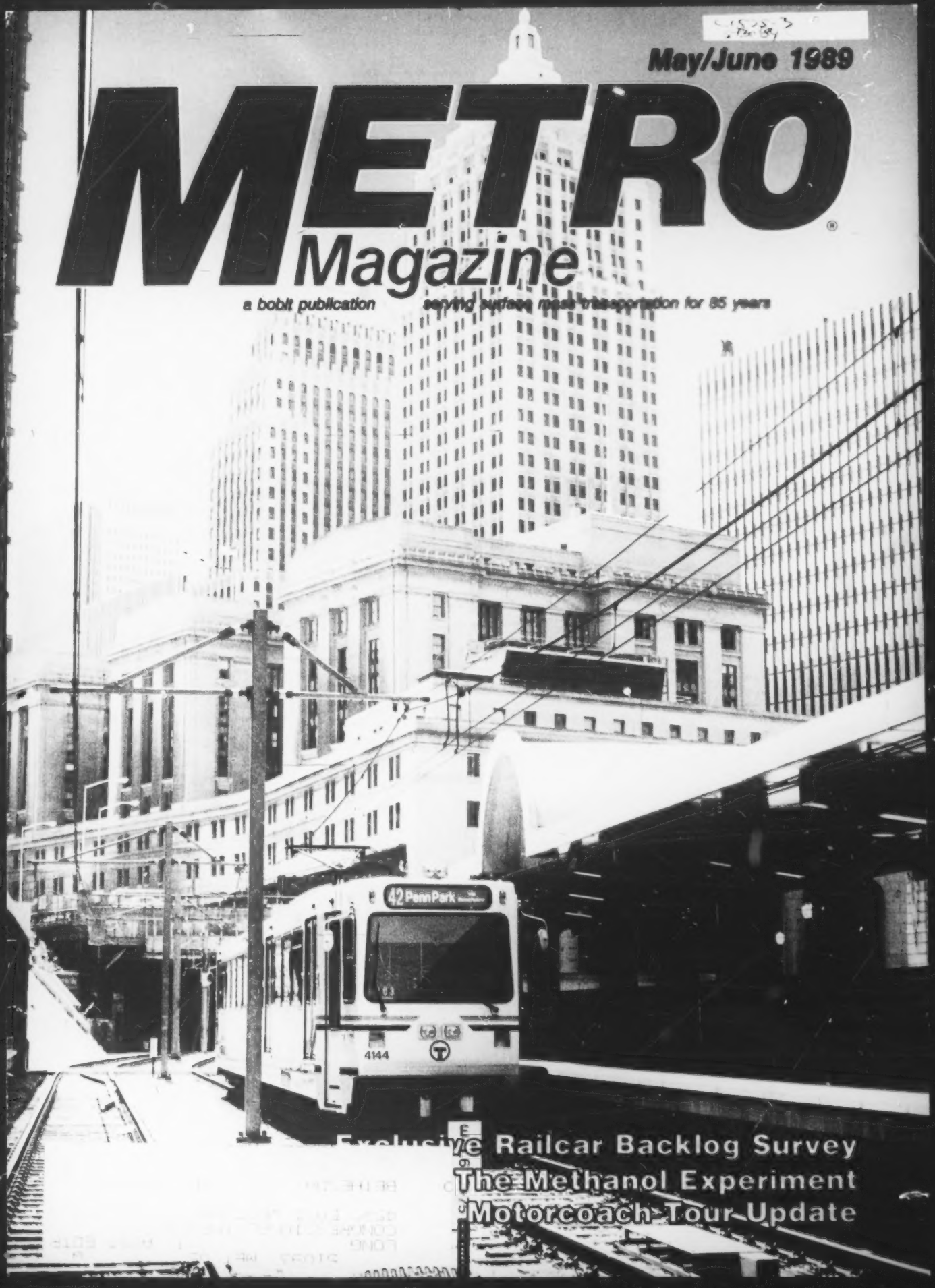

Exclusive Railcar Backlog Survey

The Methanol Experiment

Motorcoach Tour Update

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vol. 85 no. 3

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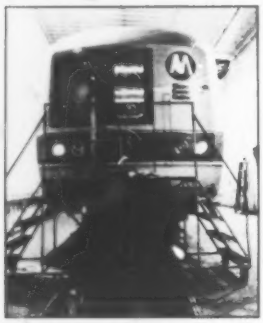

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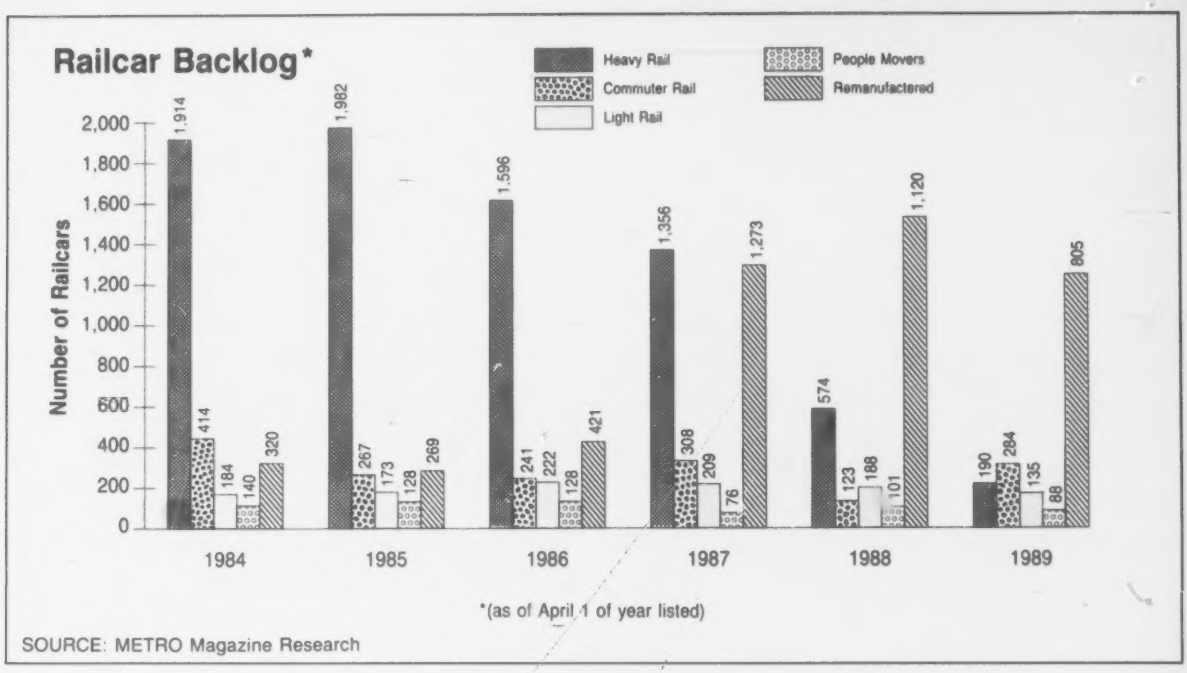
Railcar Orders Decline

METRO's exclusive Railcar Backlog Survey shows a continuing drop in new car orders as a whole, yet commuter railcar orders are up.



SOURCE: METRO Magazine Research

Orders for new railcars, including remanufactured units, have declined 49.5 percent since 1984, according to the results of the 1989 *METRO Magazine* Railcar Backlog survey. Orders for remanufactured railcars fell to 805 units in 1989 from 1,120 in 1988.

On the other hand, 1989 marks a year of increased orders for commuter railcars. The 130 percent jump over last year's orders reflects the ridership gains experienced by many commuter rail systems. (See story on page 52).

As of April 1, 1989, a total of 696 new and 805 remanufactured railcars were on order. As shown by the chart on page 20, the railcars have been ordered by 21 North American transit agencies representing 17 cities, and are valued at $1.8 billion. This total is an increase over last year's figure of $1.5 billion, in spite of the fact that there has been a 28.6 percent decline in the number of railcars on order.

Now that the Safe Harbor Leasing Act has expired, transit agencies can no longer take advantage of the benefits of depreciation. Belt-tightening at the federal level hurts new rail startups, and consequently, only a handful of systems have opened in the past five years. These factors contribute directly to the decline in orders. For example, new orders for heavy railcars have plunged dramatically, falling to a 1989 low of only 190 railcars from high of 1,982 units in 1985.

Also declining is the number of remanufactured railcars. Much of this decline can be attributed to the fact that sources of railcars and locomotives suitable for remanufacturing have been depleted.

Since 1984, remanufacturing has declined by 37 percent. This drop, however, does not reflect the actual appearance, growth and decline of the remanufacturing business. The first major remanufacturing orders appeared in 1983, with orders peaking at 1,273 units in 1987.

Since then, remanufactured orders have declined. According to Mike Monteferrante of Morrison Knudsen, remanufacturing was spurred by the need to contain costs, and while the large orders of the past are not likely to be repeated, remanufacturing will continue. (See the sidebar on page 56 for more on remanufacturing).

Orders for peoplemovers and monorail systems have dropped to 88 units, but new systems are slated to open soon in Dallas and Pittsburgh. In addition, the Orlando Airport Authority is expanding its system, resulting with an order for six peoplemover units. ■

METRO Magazine Railcar Backlog Survey

(As of April 1, 1989)

City/Authority	Vehicles Outstanding*	Value (In millions)	Manufacturer	Delivery Date (Targeted)
Baltimore/MMTA	**39 LR**	**$ 61**	**ABB Traction**	**early 1991**
Boston/MBTA	56 CR	45	Bombardier	7/89
	51 CR	44	Bombardier	early 1990
	75 CR	105	Kawasaki	fall 1990
Dallas/Dallas Co. Utilities & Reclamation Dist.	**4 PM**	**13**	**AEG Westinghouse**	**1992**
Dallas/McKinney Ave. Transit Authority	4 Antique Streetcars	1.2	Restored by McKinney Ave. TA	7/89
Las Vegas/McCarran Airport	**2 PM**	**4**	**AEG Westinghouse**	**10/90**
Los Angeles/LACTC	54 LR	63	Sumitomo Corp./ Nippon Sharyo	6/89
Los Angeles/SCRTD	**30 HR**	**39**	**Breda**	**4/91**
Miami/Tri-County	5 Remanufactured**	4.7	MK	9/89
Montreal/SCTUM	**24 CR**	**25.2**	**Bombardier**	**5/89**
	4 Remanufactured**	**4.1**	**Canadian National**	**12/89**
New Jersey/NJ Transit	6 HR	18	ABB Traction	12/89
	9 Locomotives	36	ABB Traction	4/90
	5 Locomotives	72	MK	6/89
New York/LIRR	**10 CR**	**24**	**Mitsui USA & Co.**	**late 1990**
	3 Locomotives	**14**	**Brown Boveri**	**late 1990**
New York/NYCTA	22 HR	23	Kawasaki	4/89
	188 Remanufactured	61	MK/NYCTA	10/89
	140 Remanufactured	51	Sumitomo	12/89
	378 Remanufactured	158	MK	10/90
	260 Remanufactured	106	NYCTA	4/91
	752 Remanufactured	303	MK	8/91
	280 Remanufactured	126	N/A	12/92
Orlando/Orlando Airport	**6 PM**	**23**	**AEG Westinghouse**	**1990**
Orlando/Walt Disney World	72 MRV	43	Bombardier	1/90
Philadelphia/SEPTA	**26 HR**	**44**	**ABB Traction**	**12/89**
Pittsburgh/Co. of Allegheny	4 PM	13	AEG Westinghouse	1992
Sacramento/SRT	**10 LR**	**14**	**Siemens/Duewag**	**4/91**
San Diego/MTDB	20 ALRV	21	Siemens/Duewag	6/89
San Francisco/BART	**88 HR**	**136**	**Soferval**	**12/89**
Toronto/GO Transit	8 Bi-Level	10.4	UTDC	4/89
	60 Bi-Level	86	UTDC	4/90
	12 Locomotivess	20.5	GM Electro-Motive Div.	12/89
Toronto/TTC	**18 HR**	**20.5**	**UTDC**	**10/89**
	12 ALRV	**17**	**UTDC**	**10/89**

*These figures represent the number of railcars that still need to be delivered as of April 1, 1989 and not the original amounts ordered in the contract.

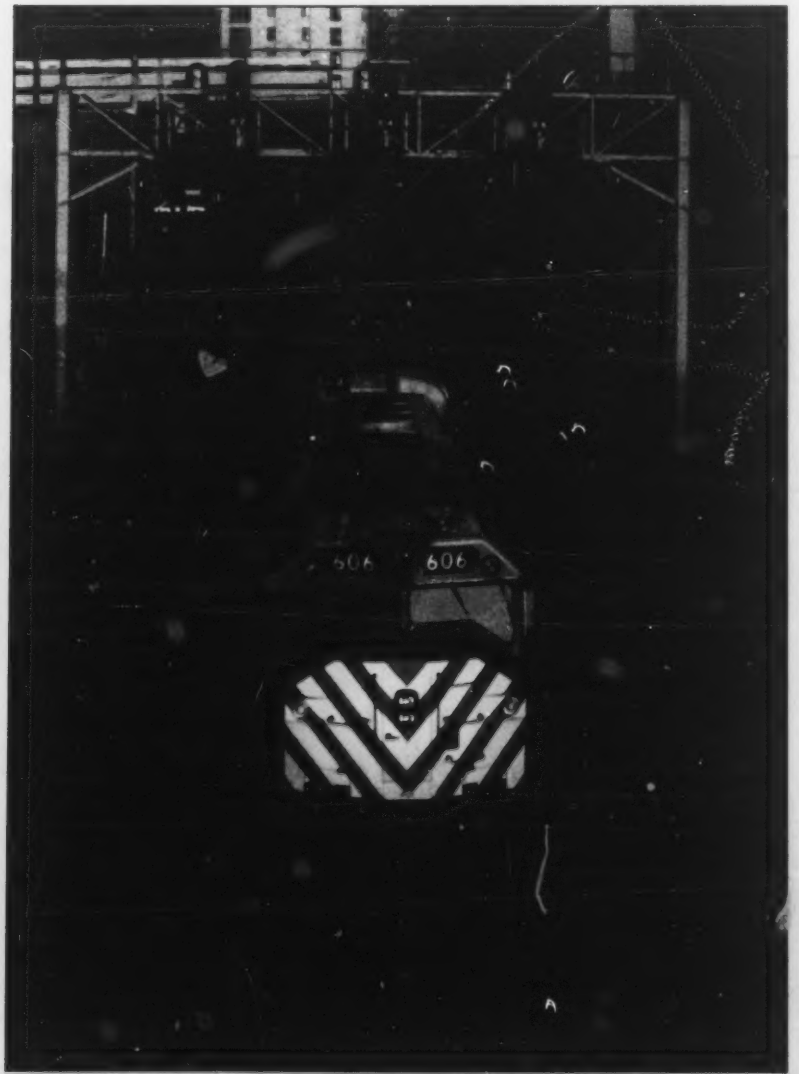
**Locomotives

ALRV = Articulated Light Rail Vehicles HR = Heavy Rail MRV = Metrorail Vehicles
CR = Commuter Rail LR = Light Rail RR = Railroad

Commuter Rail Offers One Rx For Traffic Gridlock

Commuter rail is rolling strong as riders realize that the train can be a more efficient way to travel.

Riding the rails is back in vogue, at least for a growing number of commuters and other riders who are choosing commuter rail as the way to travel. With the January 1989 opening of the 67-mile Tri-Rail system in Fort Lauderdale, Fla., a total of 12 commuter rail systems are operating across the nation. Moreover, ridership trends have sparked a growth in service — many systems that originally offered only weekday rush hour service have expanded to offer night and weekend service.



Chicago's Metra is an example of the success of commuter rail. More than 15,000 trains run each month. (Photo courtesy C. Knapton).

The second APTA Commuter Rail Transit Conference was held recently in Chicago, Ill., and was hosted by Metra, Chicago's own commuter system. More than 300 attendees gathered for three days of intensive seminars that covered everything from marketing research and finance strategies to joint use of track right-of-ways.

What has prompted this surge of interest? Growing ridership is one answer. Across the nation, patrons are turning to commuter rail as a way to avoid increasing traffic congestion and gridlock. For example, NJ Transit logged a 7.4 percent increase in ridership over the fourth quarter of 1988 when compared to the fourth quarter of 1987.

Metro-North, in New York City, reports a 6 percent ridership increase over the past five years, while the MBTA in Boston racked up an impressive 100 percent ridership increase in the same five year period. The MBTA has responded to this jump in patronage by purchasing 26 new locomotives and 107 new coaches for its commuter rail fleet. In addition, 56 coaches are scheduled for delivery in July 1989, while an order of 75 doubledecker coaches is slated to arrive in 1990.

Most experts agree that commuter rail offers many advantages, including an effective way to reach into suburban areas. Frank Cihak, APTA's executive director, technical services, says, "Systems such as

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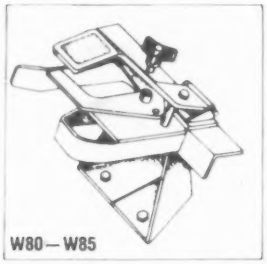
Mobile-Tech's Wheelchair Locks securely hold a wide variety of standard and electric wheelchair styles, easily adjusting to various wheel widths to lock even balloon or mag-type wheels and new model refinements eliminate rattling.

Mobile-Tech's line of locks include W80—industry standard for years:

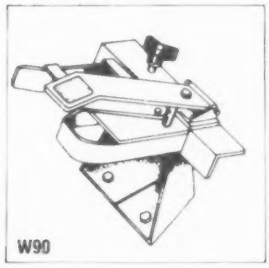
- Hand or foot operated release lever
- Wheel guides and spring loaded clamping
- Floor or wall mounting
- Height of 13½"



W80—W85

The new W85 has the same features as W80 plus:

- New wider clamping jaw to accommodate even wider wheels
- New jaw width is 3½" versus 2¾"
- Height of 13½"
- Floor or wall mounting



W90

The new W90 Transit-Lock:

- Lower profile—only 12" tall
- Lower height to accommodate more brands of seating
- New design release lever for lower profile
- Floor or wall mounting

All style locks are available in standard automatic style or switch automated electric solenoid release versions. Mobile-Tech Corporation's Wheelchair Locks are designed for retention of the wheelchairs. The use of a two-point tie-down system is recommended for the front of the chair.

Seat belts are recommended optional accessories for any of the Mobile-Tech Wheelchair Locks. (Mobile-Tech Corporation recommends the use of the W Model Wheelchair Locks in pairs only.)

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Circle 124 on METRO Action Card

Five Largest Commuter Rail Systems in the United States*

City/Authority	Number of Railcars	Number of Locomotives	Track Miles	Route Miles
New York, NY/ Long Island Railroad	1,166	85	701.6	319.1
Chicago, IL/ Metra	895	131	N/A	513
New York, NY/ Metro-North	755	37	735.5	N/A
Newark, NJ/ New Jersey Transit	645	88	769.3	394.1
Philadelphia/PA SEPTA	326	7	611	N/A

*Based on number of railcars in fleet. SOURCE: APTA

Metra in Chicago have proven that commuter rail can help alleviate traffic problems. Commuter rail is efficient and effective."

Commuter rail has emerged as a public transportation mode that can satisfy riders' needs. Ed Gregerman, APTA's director of rail technology says, "What today's commuter rail is has changed from what it started out to be. Originally, commuter rail was designed to bring people into work from the suburbs

"Commuter rail takes advantage of existing corridors. That way you don't have to start over."

—Gregerman

to the center city. Today commuter rail does more than provide rush hour service. Now more service is offered and more people are traveling during the non-rush hours such as nights and weekends."

By its very nature, commuter rail offers economical startup costs. Commuter trains typically operate over existing freight lines' track, which greatly reduces startup costs because there is no need to secure right-of-way to build track. Many transit agencies work out agreements where they lease or purchase track right-of-ways of abandoned or seldom-used freight lines. Chicago's Metra, for example, operates trains on former Rock Island and Illinois Central Gulf track.

"Commuter rail takes advantage of existing corridors," says Gregerman. "That way you don't have to start from zero."

In addition, commuter rail "recycles" retired locomotives and cars from storage yards. These "resting" vehicles undergo a sophisticated refurbishing process known as remanufacturing before they are put back into use. The idea of remanufacturing began in the early 1980's and spawned a whole new business, with Morrison Knudsen of Hornell, N.Y., emerging as a major player (see sidebar on page 56). M

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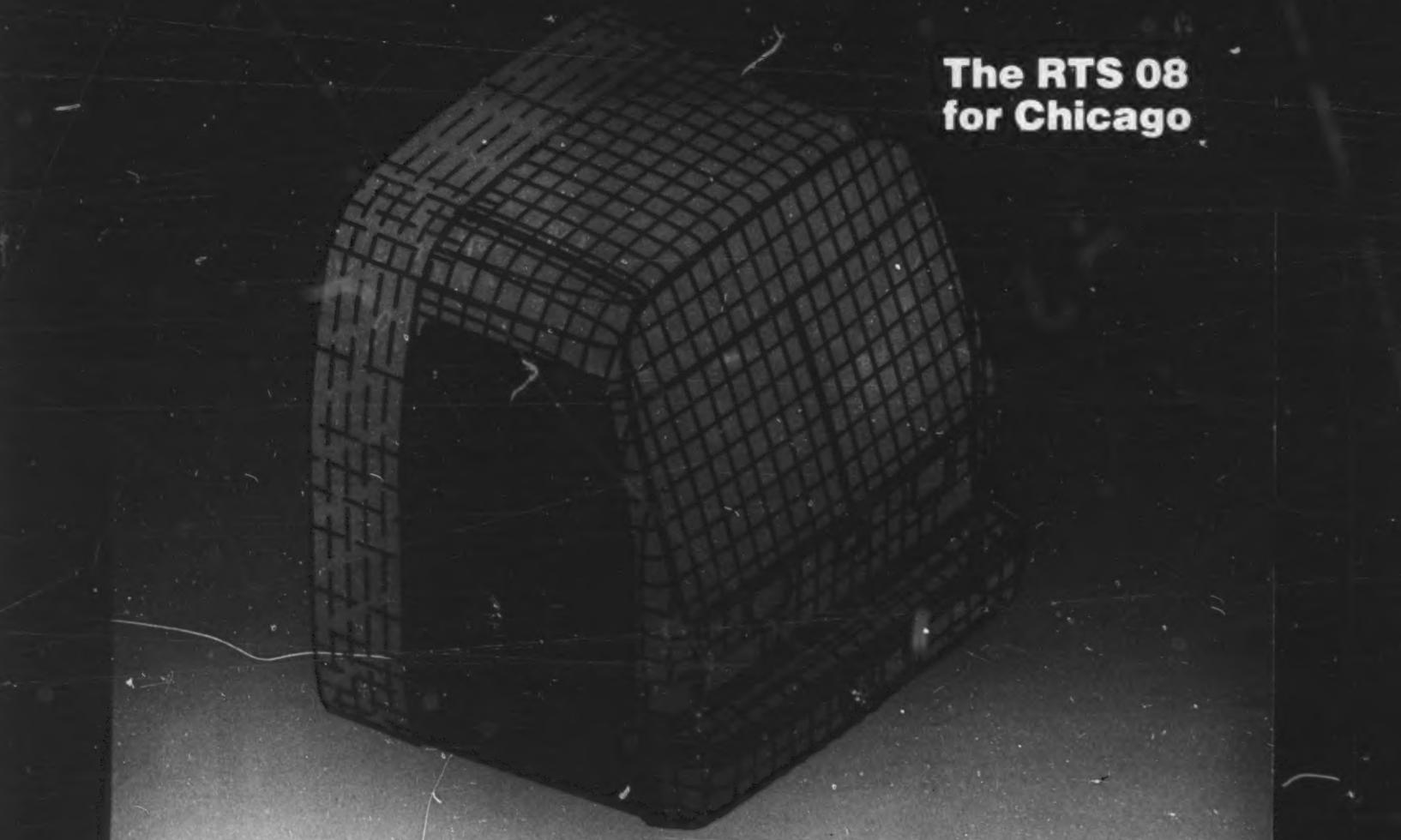

The RTS 08 for Chicago

Top 100 Transit Bus Fleet Survey

Industry Experts Look to Future

EXPO '90 Exhibitor Preview

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Computer-generated engineering drawing of front module of RTS 08.

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Top 100 Transit Bus Fleets Are Surveyed

Long Beach fleet ranks 72 in this year's survey.

Change was endemic among the properties surveyed for the 1989 METRO Top 100 Transit Bus Fleet Survey.

Altogether the relative rankings of 81 agencies changed. Moreover, 51 properties reported gains in their fleet size while 30 others reported losses. The properties surveyed this year own and operate 54,720 vehicles, up 1,081 from a year ago.

Some of the ranking changes are because this year's survey included a category for vans and small paratransit buses; those numbers haven't been consistently reported in the past. The 2,115 paratransit vehicles in that category are **operated by outside contractors** but owned by the agencies; the Top 100 fleets report 1,014 other paratransit vehicles **owned by private companies** that are also operated under contract.

One other change in methodology: Electric trolley buses are included in fleet totals; last year they were only footnoted. Moreover, diesel-powered buses simply identified as "trolley," such as the Chance trolley bus, were listed in the 35-ft. or 40-ft. categories and not in the "electric trolley" category.

A new question this year sought to establish how many transit buses in service are the result of "privatization" contracts. Altogether, including the privately-owned paratransit fleet, operators report they have privatized for 2,113 buses. That represents about three percent of the buses in the fleets surveyed.

It is interesting to note that a study conducted for UMTA by a private think tank earlier this year found that about 11 percent of all transit activity, as measured by contract value, is privatized out. Those two results suggest that twice as much non-revenue transit activity is provided to transit by the private sector, than the percent of contracted buses in revenue service.

This year, in addition to inquiring about bus fleet size, the editors asked respondents what they thought the greatest challenge is to bus acquisitions. The answers that came back included clean air regs, bus testing and funding, in that order; those three were followed by a variety of other concerns, many focusing on technology.

The potential impact of the EPA clean air regs was mentioned by more than one-third of the respondents. According to Bob Chaffen of Omnitrans, "The clean air regs have been mandated far in advance of suitable technology. Many unanswered questions remain concerning alternate-fuel vehicles."

Mike Grove, manager of maintenance at Tri-Met, reported that "delivery (of new buses) prior to the effective dates of the 1991 emissions regulations" topped his list.

Michael Sanders, director of surface transportation of the Westchester County Bee-Line Transit System, said "finding money" remains the greatest challenge. He added the clean air regs to his list "because there is no fully tested equipment available today. This adds much insecurity to the long range budget and procurement process."

Paul Gillmore, deputy assistant general manager of WMATA, believes that "because existing diesel engine technology does not meet the 1991 EPA air regulations ... new bus purchases will be restricted to alternative-fuel engines."

James R. Young of the Metro RTA in Akron, Ohio, agreed, saying, "The cost of a 35-foot, wheelchair-lift-equipped and air-conditioned bus now is $160,000 or more and federal funding continues to shrink." Only one other transit manager cited "the wheelchair lift issue on 40-foot coaches."

Meanwhile, Ronald Shipley of Pierce Transit thought the greatest challenge is "attempting to spec a bus with components you know will work at your TA, and not be considered restrictive by UMTA."

Quality control, assurance that bus manufacturers are building coaches as specified, getting a bus that will last 12 years, competitive pricing, the complexity of the federal procurement process, and lack of proven technology are among the concerns expressed by operators of the Top 100 transit bus fleets. ▣

Largest 100 Transit Bus Fleets

RANK		TRANSIT AUTHORITY, CITY	FLEET MIX/AGE					FLEET SIZE	
'89	'88	Agency Listing	35 Ft. & Over	Under 35 Ft.	Artic-ulated	Electric Trolley	Para-transit	1989 Total	± Over 1988
1	1	New York City Transit Authority New York City, NY	3800					3800	141
2	2	New Jersey Transit Corporation Maplewood, NJ	2615	40	146			2761	237
3	3	Southern California Rapid Transit District Los Angeles, CA	2368	61	40			2469	-148
4	4	Chicago Transit Authority Chicago, IL	2055		145			2200	-46
5	5	Montreal Urban Community Transit Corporation Montreal, QE	1955					1955	123
6	6	Toronto Transit Commission Toronto, ON	1577	19	90	139	123	1948	211
7	8	Washington Metropolitan Area Transit Authority Washington, DC	1495	40	76			1611	54
8	7	Southeastern Pennsylvania Transportation Authority Philadelphia, PA	1450		50	110		1610	-116
9	9	Massachusetts Bay Transportation Authority Hartford, CT	1311			50	114	1475	35
10	9	Seattle Metro Seattle, WA	544		458	154		1056	-32
11	11	Metropolitan Transit Authority Houston, TX	898	35	50		85	1068	41
12	17	British Columbia Transit Vancouver, BC	522			244	150	916	151
13	12	Metropolitan Transit Commission Minneapolis, MN	841	29	82			952	21
14	16	Dallas Area Rapid Transit Dallas, TX	809	40	50		50	799	131
15	15	Ottawa-Carlton Regional Transit Ottawa, ON	669	79	164		9	921	40
16	13	Port Authority of Allegheny County Pittsburgh, PA	671	186	50			907	-33
17	14	Mass Transit Administration Baltimore, MD	859	20			21	900	0
18	18	San Francisco Muni San Francisco, CA	422		100	344	1	873	-18
19	20	AC Transit Oakland, CA	758	7	60			825	24
20	24	Edmonton Transit Edmonton AB	502			100	39	741	-76
21	19	Greater Cleveland RTA Cleveland, OH	674				64	738	-66
22	21	TriMet Portland, OR	523		50		109	718	179
23	22	Regional Transportation District Denver, CO	564	55	89		5	713	-44
24	23	Los Angeles County Metro Los Angeles, CA	500	81			21	701	59
25	25	Metropolitan Atlanta Rapid Transit Authority Atlanta, GA	635	16	46		18	699	16

Largest 100 Transit Bus Fleets

RANK		TRANSIT AUTHORITY, CITY	FLEET MIX/AGE				FLEET SIZE	
'89	'88	Agency Listing	35 Ft. & Over	Under 35 Ft.	Artic-ulated	Electric Trolley	Para-transit	1989 Total	± Over 1988
26	21	Pace Suburban Bus Division of RTA Arlington Heights, IL	486	29			147	662	-104
27	23	VIA Metropolitan Transit San Antonio, TX	479	50			40	579	102
28	28	Detroit Department of Transportation Detroit, MI	581					581	0
29	29	Orange County Transit District Garden Grove, CA	401	41			135	577	-2
30	26	Calgary Transit Calgary, AB	523	51			3	577	-21
31	32	Metro-Dade Transit Agency Miami, FL	533	15				548	22
32	30	Milwaukee County Transit System Milwaukee, WI	510	3	40			553	0
33	27	Santa Clara County Transit Authority San Jose, CA	488	40				528	-79
34	37	Connecticut Transit Hartford, CT	491					491	71
35	35	Honolulu Transportation Services Honolulu, HI	397	30	40			467	5
36	55	Suburban Mobility RTA Detroit, MI	241				206	447	203
37	36	Regional Transit Authority New Orleans, LA	317	35				352	-7
38	40	Utah Transit Authority Salt Lake City, UT	369	24			35	428	45
39	38	Regional Transit District Denver, CO	407					407	-1
40	39	Liberty Lines Yonkers, NY	349		61			410	-61
41	33	Transportation Authority Fort Worth, TX	388					388	-22
42	41	Southwest Ohio Regional Transit Authority Cincinnati, OH	379					379	0
43	44	Chicago Transit Authority Chicago, IL	370					370	0
44	43	Westchester County Transit White Plains, NY	241	14	61		20	336	-2
45	45	Metropolitan Transit Authority Houston, TX	320					320	0
46	45	San Mateo County Transit Burlingame, CA	269	1	40		16	327	10
47	47	Tri-County Metropolitan Transportation Portland, OR	313					313	0
48	42	Central Ohio Transit Authority Columbus, OH	299	10				309	-33
49	49	Metropolitan Transit Authority Nashville, TN	300					300	0
50	66	Pioneer Valley Transit Authority Springfield, MA	197	17			71	285	55

Largest 100 Transit Bus Fleets

RANK		TRANSIT AUTHORITY, CITY	FLEET MIX/AGE					FLEET SIZE	
'89	'88	Agency Listing	35 Ft. & Over	Under 35 Ft.	Articulated	Electric Trolley	Paratransit	1989 Total	± Over 1988
51	50	San Diego Transit Corporation San Diego, CA	236		45			281	-2
52	49	Kansas City Transit Authority Kansas City, MO	232	4				276	-13
53	64	Tidewater Transportation District Norfolk, VA	180	15			73	268	46
54	57	Memphis Transit Authority Memphis, TN	212		20		24	256	20
55	61	Mississauga Transit Mississauga, ON	217		38			255	25
56	51	Queens Surface Corporation Flushing, NY	230					230	-19
57	59	Capital District Transportation Authority Albany, NY	214	12	8		15	249	3
58	54	Rhode Island Transit Authority Providence, RI	242	4	3			251	1
59	52	Indianapolis Public Transportation Corporation Indianapolis, IN	202	6	30		7	245	-15
60	67	Toledo Area Regional Transit Authority Toledo, OH	196	27			12	235	27
61	63	Trailways Commuter Transit Dallas, TX	232					232	5
62	62	Rochester-Genesee Regional Transportation Rochester, NY	213		17			230	-34
63	62	Miami Valley Regional Transit Authority Dayton, OH	151			65	12	228	0
64	53	Capital Metropolitan Transit Authority Austin, TX	0	196			31	227	0
65	66	Triboro Coach Corporation Jackson Heights, NY	222					222	0
66	72	Montgomery County Ride-On Rockville, MD	0	186			30	216	25
67	68	Greater Richmond Transit Company Richmond, VA	207					207	0
68	70	Sacramento Regional Transit District Sacramento, CA	200					204	4
69	69	GO Transit Downsview, ON	197	3				200	-4
70	56	Broward County Coast Transit Pompano Beach, FL	197					197	-42
71	71	Central New York Regional Transit Authority Syracuse, NY	177	5			14	196	-5
72	73	Long Beach Transit Long Beach, CA	192					192	0
73	74	Hillsborough Area Regional Transit Authority Tampa, FL	194					194	17
74	75	Metro Area Express Phoenix, AZ	182	12				194	5
75	65	Metropolitan Transit Authority Nashville, TN	129	13	15		23	180	32

Largest 100 Transit Bus Fleets

RANK		TRANSIT AUTHORITY, CITY	FLEET MIX/AGE				FLEET SIZE	
'88	'89	Agency Listing	35 Ft. & Over	Under 35 Ft.	Artic.	Electric Trolley	Para-transit	1989 Total	+ Over '88
76	73	Madison Metro Transit System Madison, WI	169				9	178	-17
77	80	Charlotte Transit System Charlotte, NC	155				17	172	17
78	81	Pierce Transit Tacoma, WA	148				23	171	23
79	78	Jacksonville Transportation Authority Jacksonville, FL	146	13	10			169	3
80	79	OMNITRANS San Bernardino, CA	83				82	165	8
81	77	Command Bus Company Brooklyn, NY	154					154	-14
82	89	Pinellas Suncoast Transit Authority Clearwater, FL	122				31	153	29
83	84	Sun Tran Tucson, AZ	149					149	10
84	87	Snohomish Community Transit Everett, WA	144	5				149	0
85	85	Fort Worth Transportation Authority Fort Worth, TX	131				19	150	-2
86	96	Pee Dee Regional Transportation Authority Florence, SC	6	118			17	141	30
87	95	Peninsula Transportation District Hampton, VA	104				28	132	10
88	82	Sun Metro El Paso, TX	84	30			18	132	-13
89	88	Metro Regional Transit Authority Akron, OH	116				10	126	-3
90	86	Santa Monica Bus Lines Santa Monica, CA	129					129	0
91		Central Contra Costa Transit Authority Concord, CA	96	17			14	127	0
92	90	North San Diego Transit District Oceanside, CA	124					124	0
93	92	North Suburban Mass Transit District Des Plaines, IL	124					124	2
94	*	Birmingham-Jefferson County Transit Authority Birmingham, AL	115	5				120	20
95	94	Spokane Transit Authority Spokane, WA	102		16			118	3
96	60	WED Transportation Systems Lake Buena Vista, FL	109				7	116	-114
97	*	Jamaica Buses, Inc. New Bedford, MA	116					116	116
98	99	Des Moines Metropolitan Transit Authority Des Moines, IA	62	20			25	107	10
99	91	Albuquerque Transit Albuquerque, NM	107					107	-15
100	*	Central Oklahoma Transportation & Parking Oklahoma City, OK	95	4			5	104	9

*New this year.

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METRO Magazine

1988-89 Special Edition

$25

FACT BOOK

Bus & Chassis Manufacturers
Component & Service Suppliers
Railcar Manufacturers
Consultants & Industry Statistics

METRO Magazine

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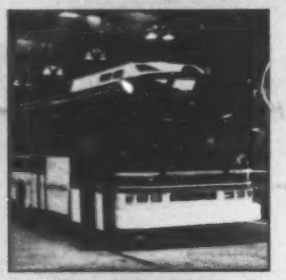
BOBIT PUBLISHING



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Annual Fact Book 1988-89

(Published in the Fall Quarter)

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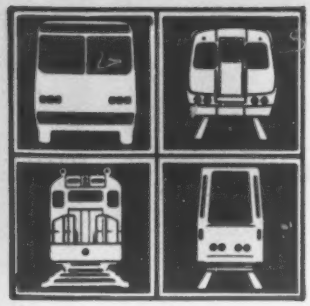
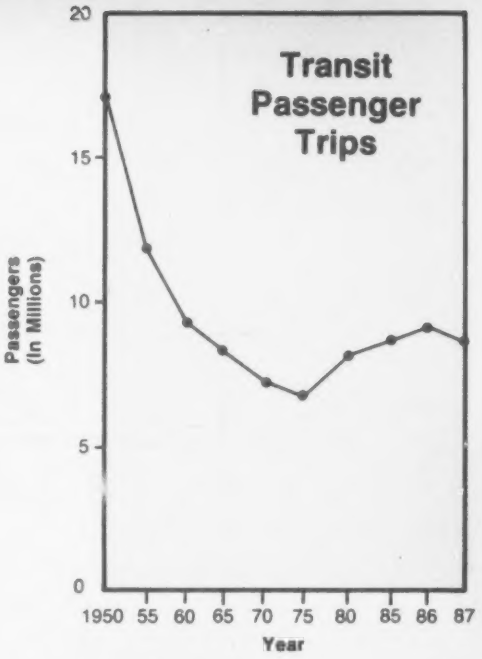
Statistics



Gridlock has become a 1980's catchword that conjures up images of traffic-jammed streets, clogged freeways and even crowded skies. Meanwhile, mass transit — one alternative that can actually help reduce gridlock — continues to play only a small role in America's transportation system.

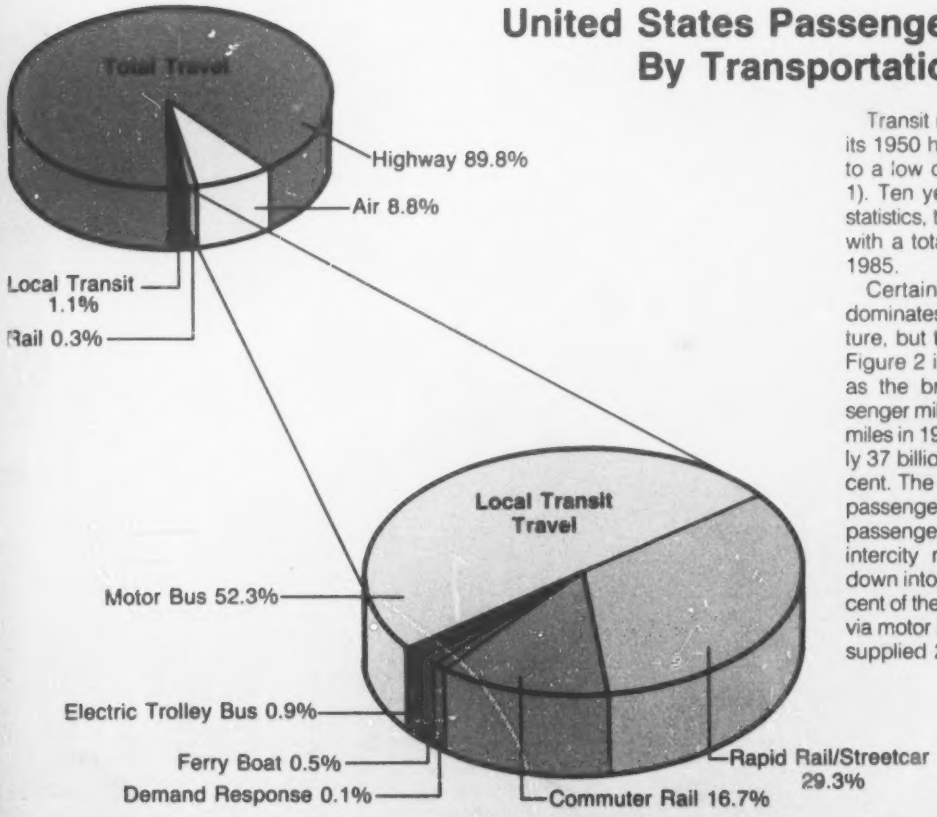
According to UMTA, in 1985, the mass transit industry provided more than 2.4 billion vehicle miles of mass transit service, utilizing a fleet of more than 105,000 vehicles. Meanwhile, the Motor Vehicle Manufacturers Association's statistics show that in 1986, Americans, driving approximately 120 million cars, racked up nearly 1.5 trillion vehicle miles. Although transit's vehicle miles have increased about 10 percent from 1965 to 1985, the total vehicle miles for automobiles have skyrocketed much faster.



SOURCE: APTA

Fig. 1

United States Passenger Miles in 1985 By Transportation Mode



Transit ridership fell dramatically from its 1950 high of 17.2 billion passengers to a low of 7.2 billion in 1975 (see Fig. 1). Ten years later, according to APTA statistics, transit had recovered ridership, with a total of 8.9 billion passengers in 1985.

Certainly private automobile use dominates America's transportation picture, but transit remains a crucial facet. Figure 2 illustrates transit's role, as well as the breakdown of modes by passenger miles. Out of 3.3 trillion passenger miles in 1985, mass transit supplied nearly 37 billion miles of the total, or 1.1 percent. The highway travel figures include passenger miles supplied by personal passenger cars, taxis, school buses, and intercity motorcoaches. When broken down into transportation modes, 52 percent of the passenger miles were traveled via motor buses, while rapid rail/streetcar supplied 29 percent.

Fig. 2

SOURCE: U.S. DOT Annual Report

Statistics

UMTA Grants Appropriations Fiscal Years 1965–1987

1965	$ 65,300,000
1966	135,455,000
1967	130,735,000
1968	125,690,000
1969	175,000,000
1970	176,600,000
1971	600,000,000
1972	900,000,000
1973	1,000,000,000
1974	1,010,650,000
1975	1,803,330,000
1976	2,360,000,000
TQ	395,100,000
1977	2,642,072,080
1978	3,027,760,493
1979	3,439,114,105
1980	3,703,259,000
1981	4,411,572,414
1982	3,532,238,000
1983	4,477,607,000
1984	4,243,192,000
1985	4,131,500,000
1986	3,564,251,000
1987	3,452,020,000
	$49,502,646,000

SOURCE: U.S. DOT **Fig. 3**

From 1965 to the early 1980's, the federal government funded large percentages of transit's costs. One effect of the Reagan Administration is the shift away from federal funding of transit. With the diminishing federal role, there has been a shift toward state and local funding. Still, as Fig. 3 illustrates, billions of dollars have been spent on transit. The yearly UMTA grants appropriations totals include administration costs and the following funding Urban Mass Transportation Act of 1964 sources:

- Section 3
- Section 8
- Section 16(b)(12) (E&H)
- Innovative Technology/ Technology Introductions
- Section 17
- Section 5 (1975-1983)
- Sections 9/9A/9B
- Sections 18 & RTAP
- Sections 6/10/11/20/32
- Interstate Transfer Substitution Program
- Stark-Harris (1983-1987)

Where does all this money go? Fig. 4 lists 22 large urban areas that received most of the funds. Not surprisingly, large urban areas in the Northeast top the list.

Federal Capital Grants for 22 Large Urbanized Areas (1965–1987)

New York-Northeastern NJ*	$ 7,404,797,005
Washington, D.C.*	3,735,614,846
Boston	2,688,811,526
Chicago-Northwestern IN	3,110,233,477
Philadelphia	1,867,302,149
San Francisco-Oakland	1,506,376,607
Atlanta	1,448,542,578
Los Angeles	1,474,982,271
Miami	986,753,943
Baltimore	997,469,944
Pittsburgh	828,608,024
Buffalo	504,917,847
Cleveland	453,588,113
Portland	395,619,981
Detroit	356,672,714
Seattle	450,105,362
Houston	423,718,047
San Jose	351,117,494
Dallas	216,052,500
Minneapolis	200,250,496
New Orleans	196,184,289
San Juan	132,860,720
	$29,730,579,933

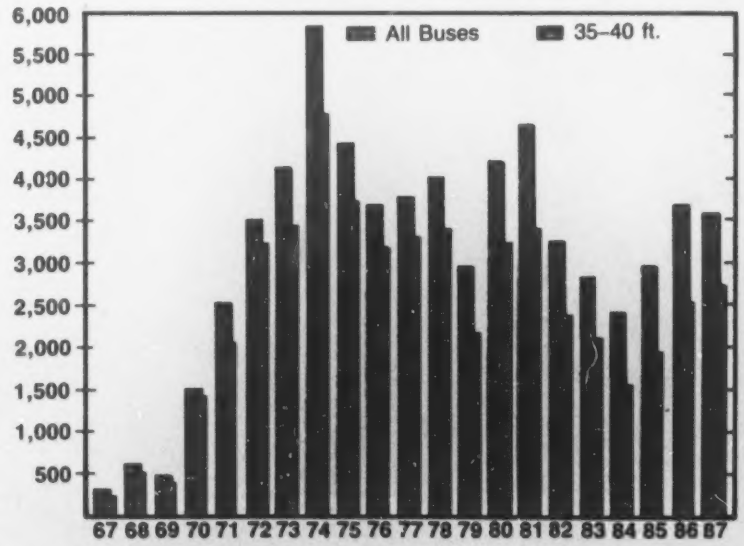
*Include Stark-Harris grants but does not include $1.2 billion in direct appropriations and $549 million in bond interest payments.

SOURCE: U.S. DOT **Fig. 4**

The nation's bus fleet shifted from private to public operation as the federal government began to fund the purchase of buses. As Fig. 5 illustrates, the UMTA-funded bus fleet has grown significantly since 1965, although the 1987 totals are much lower than the peak levels attained in 1974.

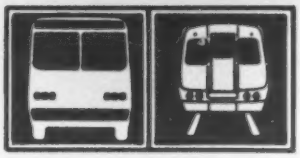
In addition to rolling stock such as buses, UMTA also funds much of America's transit infrastructure. UMTA's 1985 inventory of transit infrastructure includes 1,642 route miles of rail rapid transit track, 429 miles of streetcar track, 4,300 miles of commuter rail track, and more than 500 bus maintenance facilities. Rapid rail track totals are up 3 percent from 1984, while the number of federally-funded bus maintenance facilities increased 4 percent.

UMTA Funded Transit Buses 1967-1987



From 1967 through 1987 UMTA has funded 66,175 transit buses of which 53,303 were standard 35-40 foot buses.

SOURCE: Urban Mass Transportation Administration **Fig. 5**

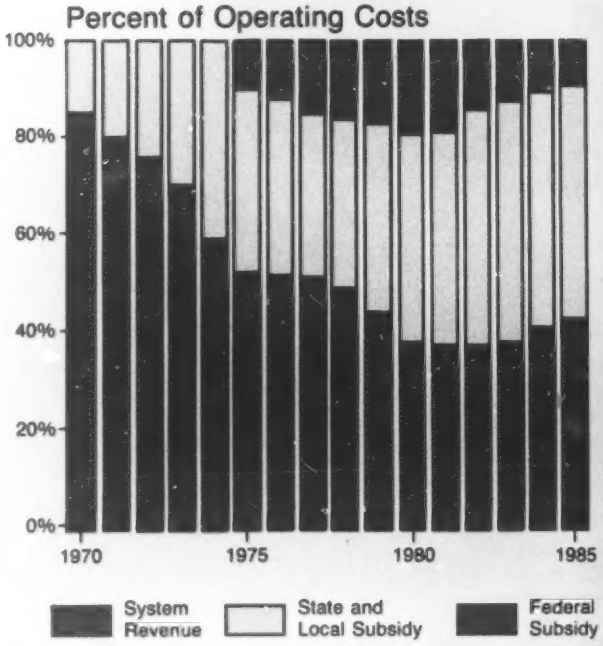


In 1985, the farebox covered approximately 44 percent of transit operating costs, state and local subsidies covered 48 percent and federal funding supplied 8 percent. Federal operating assistance began in 1975 and peaked in 1980, and has since declined significantly. As seen in Fig. 6, local governments in particular have shouldered more responsibility.

Even if farebox revenues remain stable or increase, transit agencies are turning to state and local sources. State and local sources contribute up to six times the federal contribution to fund operating expenses. Studies by the American Association of State Highway and Transportation Officials show that in 1983, state aid totalled $2.7 billion, while 1986 state contributions added up to $3.5 billion; meanwhile, local funding is on the increase, too (see Fig. 7).

Not only have funding sources shifted, but so have the types of appropriations. Beginning in the 1960's, UMTA awarded discretionary grants for capital assistance. When the UTA was revised in 1983, formula grants were initiated through the Section 9 program. As Fig. 8 shows, the formula grant process has become the dominant federal source of funds.

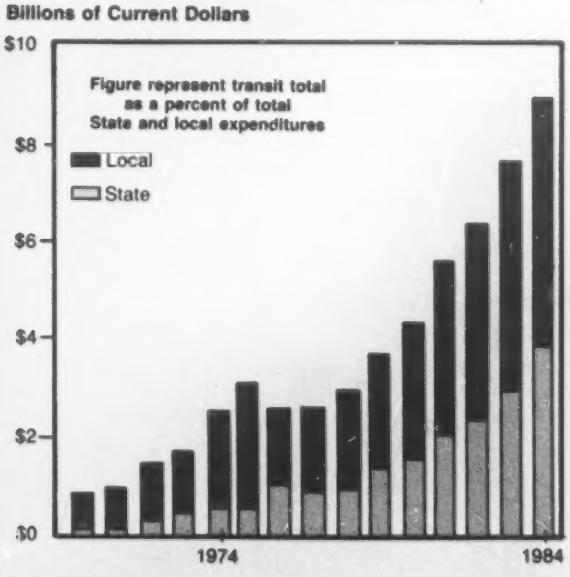
Sources of Transit Operating Revenues 1970 to 1985



SOURCE: APTA Fact Book UMTA Section 15 Data

Fig. 6

State and Local Expenditures on Transit* and Their Share of Total State and Local Expenditures, 1970–1984

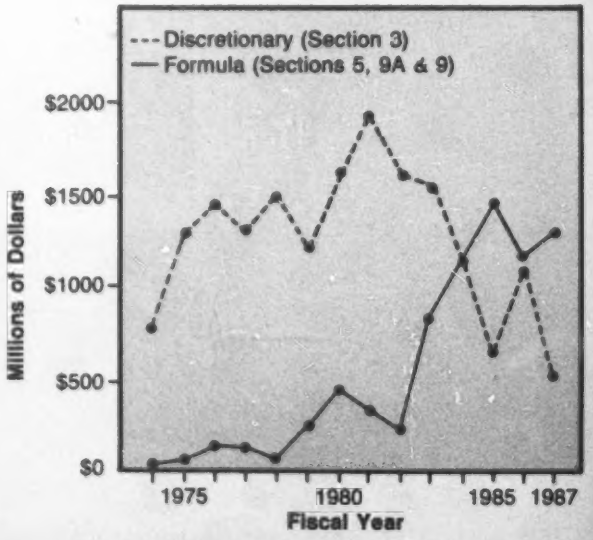


*Includes expenditures on railroads.

SOURCE: Survey of Current Business

Fig. 7

Capital Discretionary and Formula Grants 1975 Through 1987



SOURCE: U.S. DOT

Fig. 8

Statistics

The fifth annaul *METRO Magazine* Railcar Backlog Survey, conducted in the spring, revealed that the rehabilitation or remanufacture of railcars is still a considerable portion of railcar construction (see Fig. 9). North American transit fleets reported 1,120 railcars currently being remanufactured. Meanwhile only 574 new heavy railcars are on order, less than half the number reported last year. This year's orders represent nearly $1.5 billion. Just after the survey was conducted, the SCRTD in Los Angeles ordered 30 railcars from Breda for more than $54 million.

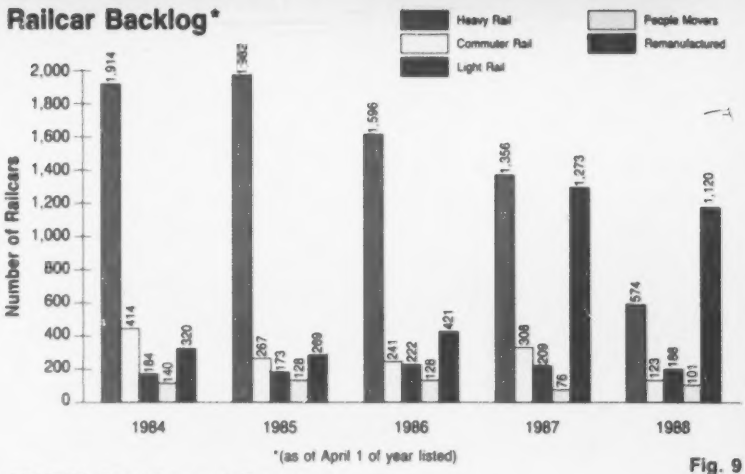


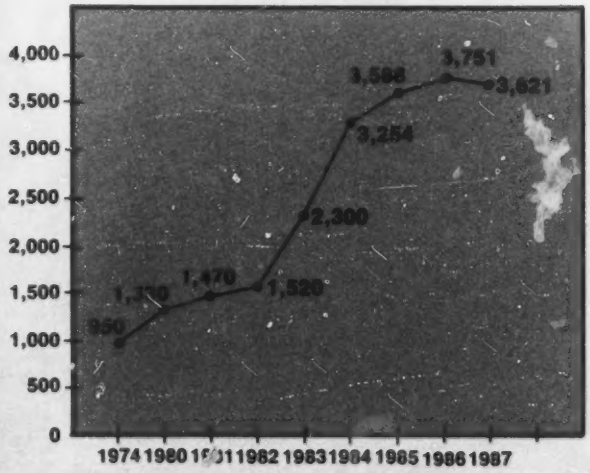
Fig. 9

SOURCE: Bobit Research Department

The number of companies applying for charter authority with the Interstate Commerce Commission (ICC) peaked in 1986 after the steep increase which occurred on the heels of the 1982 Bus Regulatory Reform Act (see Fig. 10). The ICC listed 3,621 applicants as of December 31, 1987, a decrease of 130 from the year before. According to a spokesman for the American Bus Association, only approximately half of the applicants are actively providing charter service.

Meanwhile, the First Annual SEA Motorcoach Tour Index Report provides an updated overview of North American charter/tour trends. As Fig. 11 illustrates, the length of time and cost of the average chartered motorcoach tour is steadily increasing. Travellers now spend an average of 6.7 days on a tour, compared to 6.37 days in 1985. Accordingly, the average price per day of a motorcoach tour has risen to more than $101, an 11 percent increase in two years.

Number of Intercity/ Tour/Charter Companies
(Includes All Classes of Carriers)



SOURCE: Interstate Commerce Commission

Fig. 10

North American Motorcoach Tours Selected Trends

Trends	1985	1986	1987
Average scheduled days (tour duration)	6.37	6.55	6.70
Average scheduled nights spent in destination regions	5.82	5.97	6.06
Average price per tour day	$91.04	$92.13	$101.50
Net flow of tour days (all regions)	447,423	538,931	561,271

SOURCE: SEA Tourism/Travel Research First Annual SEA Motorcoach Tour Index Report

Fig. 11

Statistics

Capital purchases such as buses aren't the only big ticket items required to keep mass transit running. Labor, calculated as a part of operational costs, adds up to millions of dollars each year. Urban Institute studies have found that in urban areas of over 1 million people, labor compensation per employee in multi-modal agencies averaged about $37,000 a year in 1985.

Inflation and cost of living influences compensation, but as Fig. 12 illustrates, there is a large gap between transit employee wages and private sector wages. Fig. 12 tracks total compensation (including both wages and all current and accrued benefit costs) for a standardized year of transit operations in comparison with similar occupations within the private sector.

An UMTA study found that,based on findings of wages in eight large cities, on average, "total compensation for public sector transit bus drivers was 31 percent higher than unionized private sector drivers and 91 percent higher than nonunion private sector drivers."

Total Compensation Comparison: Public vs. Private Bus Driver With Five Years Experience, 1985

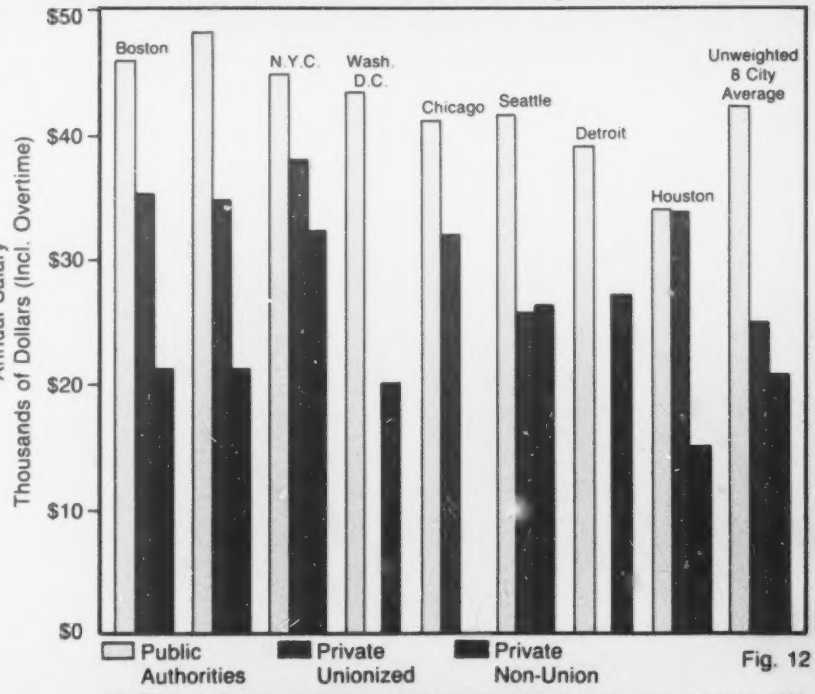
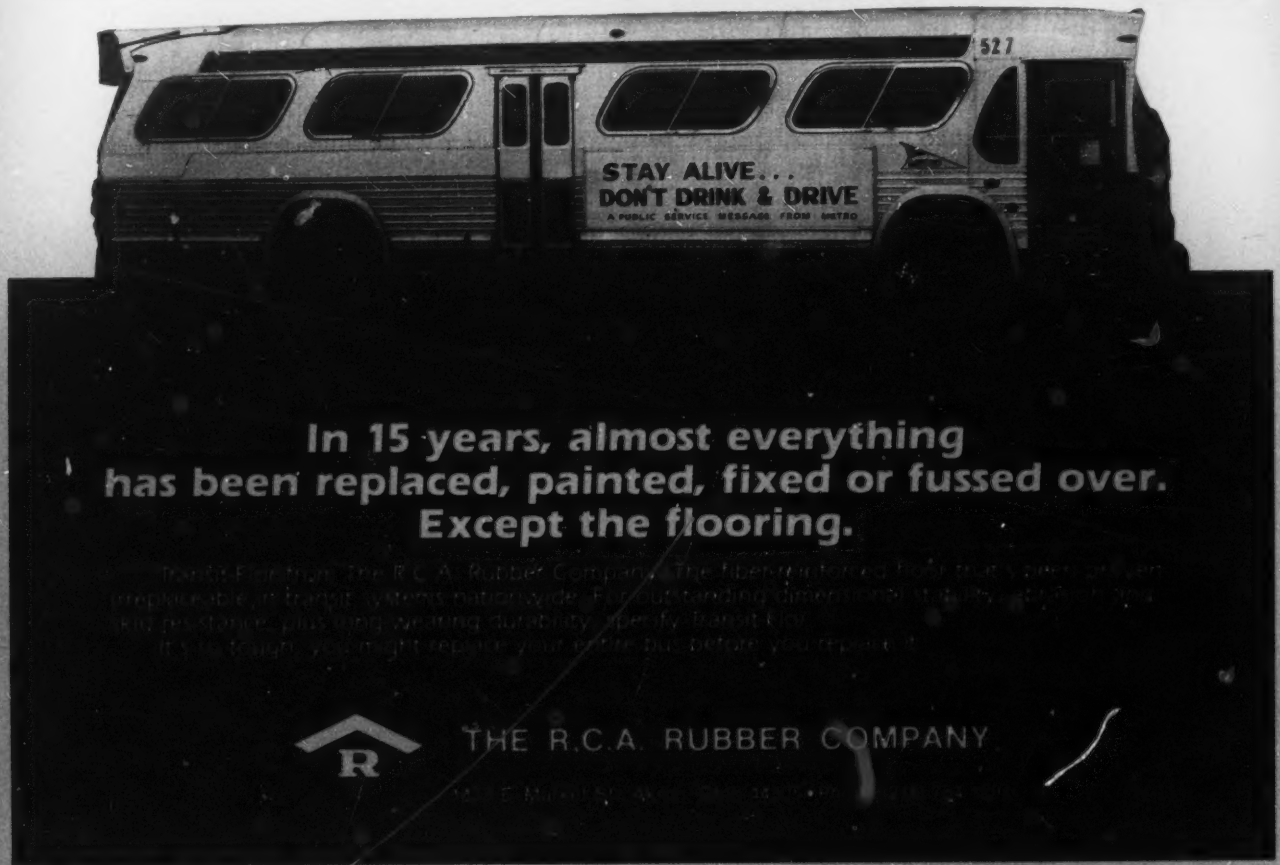


Fig. 12

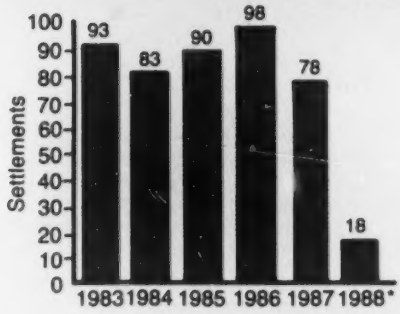
SOURCE: Urban Institute, total compensation for transit employees in large metropolitan areas, 1986.


527
STAY ALIVE...
DON'T DRINK & DRIVE
A PUBLIC SERVICE MESSAGE FROM METRO
In 15 years, almost everything
has been replaced, painted, fixed or fussed over.
Except the flooring.
THE R.C.A. RUBBER COMPANY

Statistics

In the last two years, transit labor settlements have lagged behind inflation slightly, reversing the trend that prevailed in the preceding three years. Meanwhile, labor contracts became shorter, and hourly wage increases tended to the 21 cent to 40 cent range during the first six months of 1988. Contracts of one year or less duration have fallen dramatically, as have those of more than three years. While hourly wage increases are clustering in the 21 cent to 40 cent range, an interesting spike appears to be occurring in the 81 cent to dollar-an-hour range, too. Labor traditionally consumes about 70 percent of every dollar spent in the public transit industry. According to labor negotiator Tom Hock of ATE Labor Services, more than 80 percent of all unionized transit workers are represented by the number of settlements.

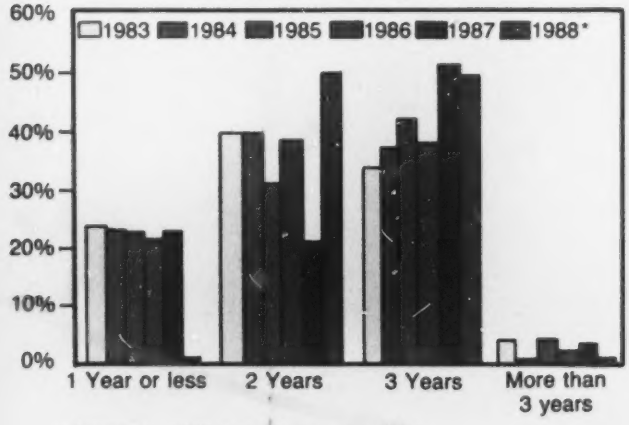
Number of Settlements



*January 1, 1988 through June 30, 1988.

Fig. 13

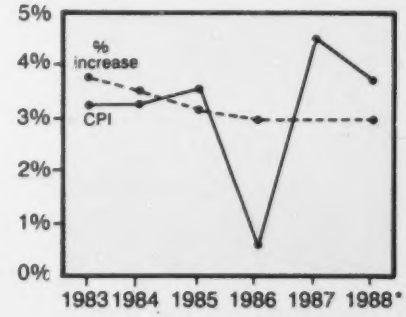
Contract Duration



*January 1, 1988 through June 30, 1988.

Fig. 14

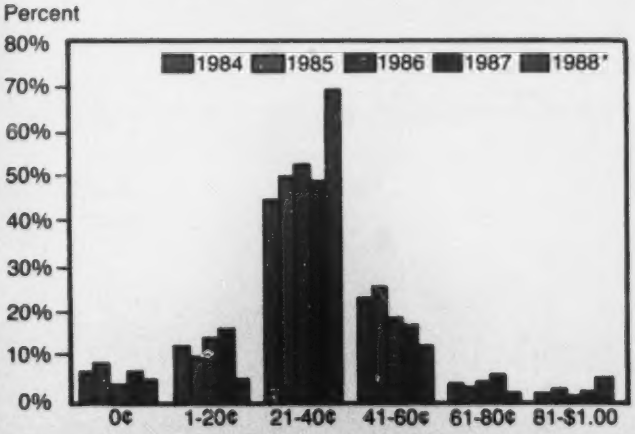
Average Percent Increase Per Year of Contract vs. Consumer Price Index



*January 1, 1988 through June 30, 1988.

Fig. 15

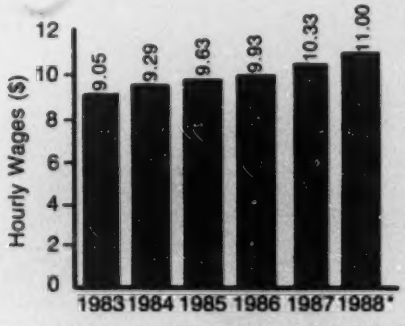
Wage Changes per Year of Contract (in cents per hour)



*January 1, 1988 through June 30, 1988.

Fig. 16

Average Top Operators' Rate in Effect Prior to Contracts Negotiated Each Year



*January 1, 1988 through June 30, 1988.

Fig. 17